

Patent claims

1. Laminated safety glass, comprising
- a first and a second pane of glass, and also,
 - arranged between the first and the second pane of glass, an intermediate layer, where the intermediate layer comprises:
 - from 50 to 80% by weight of PVB (partially acetalized polyvinyl alcohol)
 - from 20 to 50% by weight of a plasticizer mixture, comprising
 - from 30 to 70% by weight - calculated as proportion of the plasticizer mixture - of one or more polyalkylene glycols selected from the group consisting of
 - polyalkylene glycols of the general formula $\text{HO}-(\text{R}-\text{O})_n-\text{H}$, where $\text{R} = \text{alkylene}$ and $n > 5$,
 - block copolymers of ethylene glycol and propylene glycol having the general formula $\text{HO}-(\text{CH}_2-\text{CH}_2-\text{O})_n-(\text{CH}_2-\text{CH}(\text{CH}_3)-\text{O})_m-\text{H}$, where $n > 2$, $m > 3$, and $(n+m) < 25$,
 - derivatives of block copolymers of ethylene glycol and propylene glycol having the general formula $\text{R}_1\text{O}-(\text{CH}_2-\text{CH}_2-\text{O})_n-(\text{CH}_2-\text{CH}(\text{CH}_3)-\text{O})_m-\text{H}$ or $\text{HO}-(\text{CH}_2-\text{CH}_2-\text{O})_n-(\text{CH}_2-\text{CH}(\text{CH}_3)-\text{O})_m-\text{R}_1$, where $n > 2$, $m > 3$, and $(n+m) < 25$ and R_1 as organic radical,
 - derivatives of polyalkylene glycols of the general formula $\text{R}_1-\text{O}-(\text{R}_2-\text{O})_n-\text{H}$, where $\text{R}_2 = \text{alkylene}$ and $n \geq 2$, in which the hydrogen of one of the two terminal hydroxyl groups of the polyalkylene glycol has been replaced by an organic radical R_1 ,
 - derivatives of polyalkylene glycols of the general formula $\text{R}_1-\text{O}-(\text{R}_2-\text{O})_n-\text{R}_3$, where $\text{R}_2 = \text{alkylene}$ and $n > 5$, in which the

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- polyhydric aliphatic or aromatic alcohols or oligoether glycols having not more than four ether units with one or more unbranched or branched aliphatic or aromatic substituents, e.g. dialkyl adipate, dialkyl sebacate, esters of di-, tri- or tetraglycols with linear or branched aliphatic carboxylic acids

is used as further plasticizer in the plasticizer mixture.

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5. Laminated safety glass according to claim 4, characterized in that at least one plasticizer selected from the group consisting of di-n-hexyl adipate (DHA) and triethylene glycol bis-n-heptanoate (3G7) is used as further plasticizer at a proportion > 10% by weight of the total mixture.

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6. Laminated safety glass according to any of claims 1 to 5, characterized in that a polyvinyl butyral having from 19 to 22% by weight of vinyl alcohol radical and from 0.5 to 2.5% by weight of acetate radical is used as resin.

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7. Sound-insulation film for producing laminated safety glass, comprising:

- from 50 to 80% by weight of PVB (partially acetalized polyvinyl alcohol),
- from 20 to 50% by weight of a plasticizer mixture, comprising
 - from 30 to 70% by weight - calculated as proportion of the plasticizer mixture - of one or more polyalkylene glycols selected from the group consisting of
 - polyalkylene glycols of the general formula $\text{HO}-(\text{R}-\text{O})_n-\text{H}$, where $\text{R} = \text{alkylene}$ and $n > 5$,
 - block copolymers of ethylene glycol and propylene glycol having the general

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formula $\text{HO}-(\text{CH}_2-\text{CH}_2-\text{O})_n-(\text{CH}_2-\text{CH}(\text{CH}_3)-\text{O})_m-\text{H}$,
where $n > 2$, $m > 3$, and $(n+m) < 25$,

- derivatives of block copolymers of ethylene glycol and propylene glycol having the general formula
5 $\text{R}_1\text{O}-(\text{CH}_2-\text{CH}_2-\text{O})_n-(\text{CH}_2-\text{CH}(\text{CH}_3)-\text{O})_m-\text{H}$ or
 $\text{HO}-(\text{CH}_2-\text{CH}_2-\text{O})_n-(\text{CH}_2-\text{CH}(\text{CH}_3)-\text{O})_m-\text{R}_1$, where
 $n > 2$, $m > 3$, and $(n+m) < 25$ and R_1 as organic radical,
- 10 - derivatives of polyalkylene glycols of the general formula $\text{R}_1-\text{O}-(\text{R}_2-\text{O})_n-\text{H}$, where $\text{R}_2 =$ alkylene and $n \geq 2$, in which the hydrogen of one of the two terminal hydroxyl groups of the polyalkylene glycol has been
15 replaced by an organic radical R_1 ,
- derivatives of polyalkylene glycols of the general formula $\text{R}_1-\text{O}-(\text{R}_2-\text{O})_n-\text{R}_3$, where
 $\text{R}_2 =$ alkylene and $n > 5$, in which the hydrogen of both terminal hydroxyl groups
20 of the polyalkylene glycol has been replaced by an organic radical R_1 and, respectively, R_3 .
- 8. Use of one or more polyalkylene glycols selected
25 from the group consisting of
 - polyalkylene glycols of the general formula
 $\text{HO}-(\text{R}-\text{O})_n-\text{H}$, where $\text{R} =$ alkylene and $n > 5$,
 - block copolymers of ethylene glycol and propylene glycol having the general formula
30 $\text{HO}-(\text{CH}_2-\text{CH}_2-\text{O})_n-(\text{CH}_2-\text{CH}(\text{CH}_3)-\text{O})_m-\text{H}$, where $n > 2$, $m > 3$, and $(n+m) < 25$,
 - derivatives of block copolymers of ethylene glycol and propylene glycol having the general
35 formula $\text{R}_1\text{O}-(\text{CH}_2-\text{CH}_2-\text{O})_n-(\text{CH}_2-\text{CH}(\text{CH}_3)-\text{O})_m-\text{H}$ or
 $\text{HO}-(\text{CH}_2-\text{CH}_2-\text{O})_n-(\text{CH}_2-\text{CH}(\text{CH}_3)-\text{O})_m-\text{R}_1$, where $n > 2$,
 $m > 3$, and $(n+m) < 25$ and R_1 as organic radical,
 - derivatives of polyalkylene glycols of the general formula $\text{R}_1-\text{O}-(\text{R}_2-\text{O})_n-\text{H}$, where

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R_2 = alkylene and $n \geq 2$, in which the hydrogen of one of the two terminal hydroxyl groups of the polyalkylene glycol has been replaced by an organic radical R_1 ,

- 5 - derivatives of polyalkylene glycols of the general formula $R_1-O-(R_2-O)_n-R_3$, where R_2 = alkylene and $n > 5$, in which the hydrogen of both terminal hydroxyl groups of the polyalkylene glycol has been replaced by an
10 organic radical R_1 and, respectively, R_3 ,
as an additive improving sound insulation in films produced from plasticized PVB resin for laminated safety glass, where the sound insulation of the laminated safety glass is increased by the
15 addition of the polyalkylene glycols by at least 2 dB, measured to DIN EN ISO 717, in the coincidence frequency region from 1000 to 3500 Hz.